Iowa Department of Administrative Services – Human Resources Enterprise
Classification Series Guidelines

Design Technician Series

Classes in the Series

Class Code	Class Title
04370	Design Technician Associate
04371	Design Technician
04372	Design Technician Specialist

Series Concept

Positions classified in this series perform paraprofessional engineering design work. Technicians work in various areas, including, but not limited to technical engineering design, engineering software, management of consultant services, geotechnical design, cartography, photogrammetry, property title determination pavement design, pavement management, or automation enhancement. Technicians prepare technical plans, detail drawings, or maps for the planning and design of roadways, bridges, right of way, culverts, park facilities, bikeways and trails, lighting, drainage, and flood control systems, signing, safety improvements, pavement markings, traffic control devices, and related civil and transportation engineering projects.

Exclusions

The following are excluded from classification within this series:

1. Positions that include full supervisory functions.
2. Positions that are not related to the planning or design of improvement projects.
3. Positions performing work classified in the Engineering Aide series, the Materials Technician series, the Planning Aide series, and the Right of Way Aide series.

Class Distinctions

The following areas for evaluation are applicable to the class distinctions:

1. Computer Applications
2. Project Management
3. Planning and Design of Projects
4. Education/Training
5. Engineering Studies/Research
6. Quality Control

1. Computer Applications

- Creates and administers access privileges for Local Area Network (LAN) based server project design for use by multiple offices, by which other offices within the Department can access and utilize the project data.
- Develops, maintains, and customizes electronic files that generate the cross section drawings and performs specific computer-aided design and drafting (CADD) tasks.
- Develops batch programs to control input of specific design information.

- Utilizes engineering software to calculate or modify roadway or bridge geometrics, quantities, or other project information.
- Inputs specific project detail information into the computer files to show complete representation of the project plans, quantities, and specifications for contract documents.
- Utilizes or creates computer-generated maps, plans, or displays to illustrate project details for other offices, agencies, or the general public.
- Manages LAN based file systems, understand the file interrelationships and customize data within the files.
- Originates and generates all facets of the project plans from computer files.
- Develops and utilizes spreadsheets to automate design calculations, minimizing time for updates of project changes.
- Develops tools or programs to more efficiently use computer applications for computer-aided drafting and design (CADD) software and other applications.

NOTE: Everything is generated by computer. The computer is essential to the duties and responsibilities performed by Design Technicians.

Level	Complexity	Impact of Errors	Supervision Received	Scope of Impact	Technical/ Equipment
Associate	Entry level. Knows and understands computer file systems and management, Basic use of computer programs and has some basic programming skills. Assists Technicians, Specialists and Engineers in project development.	Errors are detected in succeeding operations where work is verified. Impact is to rework and the work of others within the section.	Close supervision with frequent review of work.	The accuracy, consistency and acceptability of work impact other employees within the work.	Trains in full use of computer applications, file management and system usage. Technical design software training for each aspect of project development.
Technician	Production level expected to develop projects or portions of complex projects independently. Expected to set up and maintain computer files, develop engineering software code, select and input alignments, develop criteria per project guidelines, and produce finished design plans, maps or other displays.	Errors are detected in succeeding operations where work is verified. Impact is to rework and the work of others in other offices.	Minimal supervision with review of work prior to submittals to other offices. Final check of quantities and projects design criteria prior to letting.	The accuracy, consistency and acceptability of work effects other offices timely completion of their work effort.	Utilizes full range of computers and software packages for project design and plan production.
Specialist	Expert in the development of complex projects or major portions of complex projects. Expected to create and administer computer files, develop engineering software code input and review alignments, project criteria and produce finished design plans, maps or other displays. Uses initiative in solving complex questions related to proper use of software, and the resultant end product.	Errors can be reflected into many projects, and cause rework for the office and other offices.	Receives general project guidelines and direction with end product review of work prior to letting.	Significantly affects the development effort of other offices, divisions, and consultants.	Recognized expert in use of new computer technologies for plan production. Trains others in detailed use of computer software applications.

2. Project Coordination

- Communicates with employees in other offices, departments, divisions, and other internal consultants as well as various federal, state, and local agencies, and the public to obtain information, facilitate project development, and keep improvement projects on schedule to construction.
- Provides detailed information on project schedules to management for tracking project development.
- Organizes work flow to effectively meet immediate and final project deadlines and assure that all partners in the development process have current and timely information for their use.
- Coordinates all aspects of the purchase of property needed for construction purposes and provide input to the most economical method to design the project.

Level	Complexity	Impact of Errors	Supervision Received	Scope of Impact	Technical/ Equipment
Associate	Entry level. Knows and understands project development process. Assists Technicians, Specialists and Engineers in project development.	Errors affect timely completion of work.	Close supervision with frequent review of progress of work.	Impacts the work effort of other workers in the section and other offices.	Technical design software training for each aspect of project development.
Technician	Production level expected to develop projects or portions of complex projects independently. Expected to communicate time requirements, project progress to supervisor and other departments.	Delay to the project due to other offices waiting on information to be completed.	Minimal supervision. Work is reviewed at major junctures of projects. Progress is monitored toward submittal of plans for letting.	Impacts the work effort of other offices within and outside of the division.	Knowledge of the development process. Utilizes full range of computers and software packages for project management.
Specialist	Expert in the management of complex projects or major portions of complex projects. Understands the development process used to produce finished design plans, maps or other displays. Estimates time requirements for completion of project elements. Coordinates submittals to other offices of information to be incorporated into project plans.	Lack of providing information to other offices in a timely manner may result to delay to project lettings.	Receives general timelines and direction with end product review of work prior to letting.	May impact the 5-year program if projects are delayed past the start of the fiscal year.	Recognized expert in project development, and project management. Trains others in detailed use of computer software applications and the development process.

3. Planning and Design of Transportation Projects

- Selects specific design criteria for each individual project depending on the type of roadway, traffic volume, location of project, and review of existing roadway.
- Selects, creates, or modifies appropriate design information such as typical cross sections, or standards to meet project requirements.
- Identifies non-standard situations and creates alternate solutions to meet concept guidelines.
- Analyzes project materials, as-built plans, and existing conditions to economically meet geotechnical requirements, right of way constraints, and environmental constraints in designing project alignment and ultimately the construction plans.
- Creates specific plan details such as structural plans, roadway intersection geometrics, traffic control layouts, and right of way, which control what and how a project is constructed.

- Reviews and interprets right of way contracts, plots, and legal descriptions to determine property ownership and title and to review property titles accessed through the internet or by reviewing the abstract. Determines the amount of property to be acquired necessary to construct the project.

Level	Complexity	Impact of Errors	Supervision Received	Scope of Impact	Technical/ Equipment
Associate	Entry level. Assists Technicians, Specialists and Engineers with the design of projects.	Errors detected in succeeding operations where work is verified. Impact is to rework and the work of others within the section.	Close supervision with frequent review of work.	Impacts other employees in a section and their completion of their work efforts.	Trains in full use of computer applications, file management and system usage. Technical design software training for each aspect of project development.
Technician	Production level expected to design projects or portions of complex projects independently. Expected to input typical cross sections as per project guidelines, meet all minimum requirements for a safe and economical design.	Errors found after major junctures in projects will cause delays and result in extensive rework for the office and for other offices.	Minimal supervision with review of work at major junctures of projects. A final detail check of quantities and projects design criteria is done prior to letting.	The accuracy consistency and acceptability of work impacts other employees within the work unit and affects other offices timely completion of their work effort.	Utilizes full range of computers and software packages for project design and plan production.
Specialist	Expert in the design of complex projects. Expected to set up design criteria per project guidelines, and produce finished design plans, maps of other displays. Coordinates with other offices, receives and checks information to be incorporated into project plans. Uses initiative in solving complex questions related to proper design.	Possible delays which may cause extensive rework for the office and for other offices. If errors are not caught in the final detail check, they can result in costly extra work orders to change the project during construction, rework before or after letting, and may cause delays to other projects. Errors may impact the project time line, contractors work and expose the public to extended construction. Project errors found during construction result in costly extra work orders.	Receives general project guidelines and direction with a general end product review of work prior to letting.	Changes affect contractors, and the public. May impact the safety of the public resulting in accidents or lawsuits against the department.	Recognized expert in use of computer technologies for plan design and production. Trains others in detailed design and the use of computer software for design.

4. Education/Training

- Arranges and conducts individual training sessions in preliminary design and detail design procedures; use of manuals, policies and procedures, and specifications.
- Schedules and coordinates training for consultants.
- Arranges and conducts individual training sessions in detail computer applications.
- Gives guidance to employees using oral or written instructions or demonstrations.

Level	Complexity	Impact of Errors	Supervision Received	Scope of Impact	Technical/ Equipment
Associate	Entry level. Shares knowledge with others.	Some delay, impact and rework cost minimal.	Close supervision.	Limited, depending on extent of background knowledge.	Trains in increasingly complex use of computer applications, file management and system usage. Technical design software training for each aspect of project development.
Technician	Provides one-on-one training for other technicians or consultants in specific areas of design or computer usage.	Delays are possible with extensive rework.	Minimal supervision.	Impacts the successful completion of projects.	Utilizes full range of computers and software packages for file management and system usage.
Specialist	Provides one-on-one or group training in specific areas of design or computer applications. Coordinates training with other offices and consultants. Receives training and passes on knowledge to other team members.	Errors may cause extensive rework for the office and for other offices on many projects, and can cause costly extra work order in construction or failure to deliver projects on time.	Receives general guidelines and direction.	Impacts the implementation and successful use of new technology or equipment.	Researches new software technologies. Recognized expert in use of new computer technology. Trains others in use of new technologies.

5. Engineering Studies/Research

- Researches standards, specifications, state and federal guidelines, historical project information, manuals, and/or material catalogs to determine specific project information.
- Researches plans, survey information, legal descriptions, or other historic project information to determine property ownership and the specific property boundaries, and to review property titles accessed through the Internet or by reviewing the abstract.
- Reviews ALAS (accident) data to determine cause and effect of accidents and specific accident patterns, and utilize the data to suggest alternate concepts or solutions for the accident location and justification for use of safety funding.
- Researches and evaluates specific software programs, for applicability to the design process.
- Prepares feasibility studies to determine the proper economic and practical design procedures, policies, specifications, and details for use in developing project concepts and location studies for projects.
- Researches project databases for similar project data to use as an example or reference to design a specific project or part of a project.
- Analyzes procedures within the design process to maximize efficiency and effectiveness.

Level	Complexity	Impact of Errors	Supervision Received	Scope of Impact	Technical/ Equipment
Associate	Entry level. Assists Technicians, Specialists and Engineers with reviewing as-built plans, researching information in manuals, specifications, legal description and other areas.	Errors are usually detected during verification of information. Some delay, impact and rework cost minimal.	Close supervision with frequent review of work.	Supports the work of other employees in the section.	Trains in full use of computer applications, file management and system usage. Utilizes the system to locate and research information related to the project.
Technician	Production level reviews as-built plans, researches information in manuals, specifications, legal description and other areas as needed to produce finished design plans, maps or other displays.	Errors are serious causing inaccuracy in the plans and extensive rework. May cause delays to project lettings.	Minimal supervision. Review of work is done at intermediate completions date for projects.	Impacts the successful completion of construction projects. May delay or impede the work effort of other offices.	Utilizes full range of computers and software packages for project design and plan production. Utilizes the system to locate and research information related to the project.
Specialist	Expert in the interpretation of as-built plans, plats, manuals, specifications, legal descriptions, etc. Researches new areas and writes special provisions covering bid items not covered in the standard specifications.	Errors are serious and may not be found until construction resulting in extra work orders.	Receives general project guidelines and direction with end product review of work prior to letting.	Impacts the project lettings and construction. Impacts the public.	Recognized expert in use of new computer technologies for research. Researches, reviews and recommends final presentation of project. Trains others in detailed use of computer software applications, such as Web use.

6. Quality Control

- Utilizes engineering software, CADD, or a calculator to verify calculations, detailed drawings, aerial photography, survey data, shop drawings, and finished plans or maps developed by co-workers, consultants, or contractors to ensure completeness, accuracy, and adherence to design concept, specifications, and contract provisions.
- Identifies errors, problems, or non-standard situations and suggests alternate solutions.
- Analyzes potential damage to properties caused by the proposed property acquisition, suggests alternate design details or changes to minimize damage to the property and reduce the cost of the acquisition.
- Analyzes various bridges or structures to select the most cost effective structure to meet site specifics.
- Follows guidelines in creating CADD file data to insure consistency such that information utilized by others is located correctly within the files

Level	Complexity	Impact of Errors	Supervision Received	Scope of Impact	Technical/ Equipment
Associate	Entry level. Assists Technicians, Specialists and Engineers in project development. Associates may check work of other Associates.	Some delay, impact and rework cost minimal.	Close supervision with frequent review of work.	Impacts team members work effort.	Trains in full use of computer applications.
Technician	Production level expected to develop projects or portions of complex projects independently. Review of Associates and other technicians work for accuracy and completeness.	Possible delay to other offices due to errors found by other offices causing extensive rework.	Minimal supervision with review of work at major junctures of projects. Final check of quantities and projects design criteria prior to letting.	Impacts team members and other offices immediate work effort.	Utilizes full range of computers and software packages to check project quantities and assure accuracy on project plans.
Specialist	Expert in the development of complex projects or major portions of complex projects. Verifies, for other Design Technicians, and the Design Technician Associate's accuracy of project design and quantities. Coordinates with other offices all information needed to complete the project plans for letting.	Possible delay to letting construction projects. Costly extra work orders and changes during construction. Errors could impact the safety of the public resulting in the accidents or lawsuits against the department.	Receives general project guidelines and direction with end product review of work prior to letting.	Impacts the timely completion of projects. Impacts the work efforts of inspectors and contractors using the plans.	Recognized expert in use of new computer technologies for quality control and plan production. Utilizes software to verify the accuracy of project design and quantities. Researches, reviews and recommends new uses of the computer for checking quantities and maintaining quality through file transfer methods. Trains others in detailed use of computer software applications.

Design Technician Associate

Positions in this class work under close supervision assisting other design technicians and engineers by working on a part of a project. The work performed is reviewed for accuracy by other technicians, so that the impact from errors is associated with minor delays due to rework. Associates generally work in Computer Applications, Design of Projects, Engineering Studies/Research, and Quality Control areas.

Design Technician

Positions at this level work on a total project. Minimal supervision is required with only intermediate checks to work at key points in the development process by an equal or by a Design Technician Specialist. Errors will impact the mission of the department in creating delays to projects and affecting the quality of the finished product. Undetected errors could pose a safety hazard to the public. Technicians at this level work in all areas.

Design Technician Specialist

The following types of positions are found at this level:

1. Positions assigned to work with major urban projects which typically involve making decisions with regard to minimizing damage to the property owner, rerouting of traffic while road

construction is underway, etc. The Specialist must deal with legal and politically sensitive issues as well. This often times requires presenting information at public hearings.

2. Positions that are assigned to work on multiple projects at this same time requiring the position to act as a lead worker over Design Technician Associates and Design Technicians.
3. Positions that involve skill and expertise in very specialized areas such as photogrammetric stereoplotter operations, soils analysis, pavement design, computer application support, etc.
4. Analyzes systems, programming, or engineering problems and develops software solutions. Coordinates with other offices necessary information to be incorporated in project plans.

Positions at this level are the primary educator for Design Technician Associates and Design Technicians. Design Technician Specialists work with minimal supervision and direction. At this level, positions have the authority to give final approval of a project for the engineer's or supervisor's signature and are considered to be experts in design details, project management, quality control, and computer usage. Errors at this level adversely affect the mission of the department by creating delays to projects, the quality of the finished product, and costly extra work orders during construction. Undetected errors could pose a safety hazard to the traveling public and litigation against the state.

Effective date: 7/99 BR